The Regional Municipality Of Halton

Ontario Ministry Of Housing

Ontario

The Town of Oakville South East Area Study Sanitary and Water Servicing

Gore & Storrie Limited
Consulting Engineers
Toronto, Ontario

1981

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EXECUTIVE SUMMARY

19 October, 1981.

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Regional Municipality of Halton,
Public Works Department,
P.O. Box 7000,
1151 Bronte Road,
Oakville, Ontario.
L6J 6E1

ATTENTION: Mr. R.W.J. Moore, P. Eng.
Director of Public Works

Gentlemen:

RE: Town of Oakville
South-East Area Study
Sanitary and Water Servicing
Your Project No. PR-270

We take pleasure in submitting to you a report of our study on the Sanitary and Water Servicing of the South-East Area of the Town of Oakville. The study area is located between the Parkway Belt on the west and south, Highway No. 5 to the north and Winston Churchill Boulevard to the east.

Our Terms of Reference were essentially to develop a proposal for servicing the study area with sanitary and water services and to provide cost estimates for these services.

A further report dealing with the storm water management aspects of the study area will be forthcoming to the Town of Oakville and to the Region.

This report is divided into two major sections - one for the sanitary sewerage system and one for the water distribution system. We include in this letter of transmittal a summary of each of these sections.

...2

Sanitary Sewerage System

We have recommended that a trunk sewer be constructed through the area to be developed along future roadways and easements. This trunk sewer would be constructed during the initial stages of development and thus the damage to existing roadways and restoration costs could be reduced. Timing of the development will be important in the installation of this sewer. Our estimate of the cost of the trunk sewer is $2,895,000.

The major problem with any trunk sewer in this area is the crossing of Joshuas Creek. We investigated three crossing techniques - an inverted siphon constructed by open-cut methods, an inverted siphon constructed by tunnelling and an aerial sewer incorporating a pedestrian walkway bridge. We have recommended that the creek be crossed using an inverted siphon constructed by open-cut methods at the dam-site. As this has been identified as an environmentally sensitive area a more detailed analysis of the environmental impacts of this type of construction will be required with related approvals from various government authorities and boards. We feel that with an alignment across an existing dam-site and planned restoration, the long-term environmental effects may be minimized.

At the Region's request we have examined the effect of servicing approximately 101.2 hectares of land within the Regional Municipality of Peel north of Highway No. 5. The total cost of the recommended trunk sewer is estimated to be $3,355,000 or $460,000 in addition to the basic cost of providing service to the Oakville study area. In addition to constructing larger sewers, the Region of Halton would have to commit approximately 5.4 ML/day of its treatment capacity to service this area.

Water Distribution System

We have considered that ultimately the residential portion of the study area, generally located south of the Canadian National Railway spur line, be serviced from the existing Zone 1 water distribution system and that the remainder of the service area be served from the Zone 3 water distribution systems.

Due to large headlosses in the existing Zone 1 distribution system the system cannot supply water to the industrial areas north of the CNR spur line tracks to meet the maximum day plus fire flow condition. The system can, however, provide acceptable service to the proposed residential area known as Joshuas Creek Estates. As an interim measure the area south of Royal Windsor Drive may be supplied from Zone 1 however, the pressure and quantity of water would be at a reduced level of service.

...3

The water supply to the remainder of the study area is by means of a Zone 3 feedermain from the Eighth Line Road Booster Station located along Upper Middle Road to approximately the east boundary of the Parkway Belt. From this point the distribution system has been set up to serve the areas north and south of the Queen Elizabeth Way.

North of the Queen Elizabeth Way we propose an interconnection with the South Peel Water System at Winston Churchill Boulevard and the proposed Queensway extension. This connection will be operated only in the event of emergencies such as a watermain failure or a fire. This will be an economical and desirable connection.

In order to provide adequate pressure in the area immediately south of Highway No. 5 we have assumed a hydraulic grade line of elevation 198 metres at the east side of the Parkway Belt. This is required for the servicing of the northern area and should be available prior to development proceeding between Highway No. 5 and the H.E.P.C. right-of-way.

South of the Queen Elizabeth Way the land slopes towards Lake Ontario. We have proposed the use of pressure-reducing valves to drop the pressure into the next lower pressure district in order to overcome topographic differences. These valves have been located to suit the proposed street layout for the Clearview development.

We have been requested to consider that the area west of the Parkway Belt, north of Upper Middle Road, south of Highway No. 5 and east of the Eighth Line would be served from the proposed Upper Middle Road feedermain. This additional area requires that the proposed Upper Middle Road feedermain be increased in that area from a 600 mm diameter pipe to a 750 mm diameter pipe. The additional cost of this requirement is estimated to be $95,000.

The estimated cost of the proposed distribution system is $5,050,000.

Financing

The Region may only obtain financing assistance for these servicing schemes under a program sponsored by the Ministry of the Environment.

The Ontario Ministry of the Environment provides 15% grants toward the capital cost of major components of communal water and sewage works. This includes for water supply; intakes, treatment and storage facilities and trunk feedermains; and for sewerage; treatment facilities, outfall and trunk sanitary sewers and associated pumping stations. Priority is given to works providing for an increased supply of serviced lots in growth areas, thus the Region of Halton is in a good position to benefit from this programme.

...4

We appreciate having had the opportunity to carry out this study on behalf of the Region and the Ministry of Housing. Should you have any questions, we would be pleased to meet with you at your convenience.

All of which is respectfully submitted

K.W. Moore, P. Eng.,
Chief Engineer,
Municipal Services.

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K. W. MOORE
PROVINCE OF ONTARIO

N.D. Huggins, P. Eng.
Project Co-ordinator.

REGISTERED PROFESSIONAL ENGINEER
N. D. HUGGINS
PROVINCE OF ONTARIO

INDEX

		PAGE
EXECUTIVE SUMMARY		
INDEX		
SECTION 1 - INTRODUCTION		
1.1	General	1-1
1.2	Terms of Reference	1-1
1.3	Population and Development Projection	1-2
1.4	Summary of Development	1-6
SECTION 2 - SANITARY SEWERAGE SYSTEM		
2.1	General	2-1
2.2	Alternative No. 1	2-1
2.3	Alternative No. 2	2-3
2.4	Joshuas Creek Crossing	2-4
2.5	Servicing Additional Area in the Region of Peel	2-8
2.6	South-East Water Pollution Control Plant	2-9
2.7	Conclusions and Recommendations	2-10
SECTION 3 - WATER SUPPLY		
3.1	General	3-1
3.2	Existing and Proposed Developments	3-1
3.3	Previous Studies	3-1
3.4	Basic Design Data	3-2
3.5	Pressure Requirements	3-5
3.6	System Operation	3-5
3.7	Pressure Zones	3-13
3.8	Proposed Feedermains	3-14
3.9	Summary of Recommendations	3-15
3.10	Cost Estimates	3-16
APPENDIX		

SECTION 1

INTRODUCTION

1.1 General

In a letter received by the Regional Municipality of Halton dated March 28, 1980, financial assistance for the South East Oakville Servicing Study was confirmed by the Ontario Ministry of Housing. Subsequent to this, the Region authorized Gore & Storrie Limited to prepare a report on servicing the south east area of Oakville regarding water supply and sanitary sewerage systems. The storm sewerage system will be investigated at a later date in co-operation with the Town of Oakville. The main objective of this report is to provide the Region with a master plan for servicing this area. It is intended that the report will act as a guideline for the construction of water supply and sewerage facilities for the development to be built in the immediate future and for the long-term planning of future development areas. It will also act as a base on which the Town of Oakville can develop a policy on phasing and cost sharing for the major facilities.

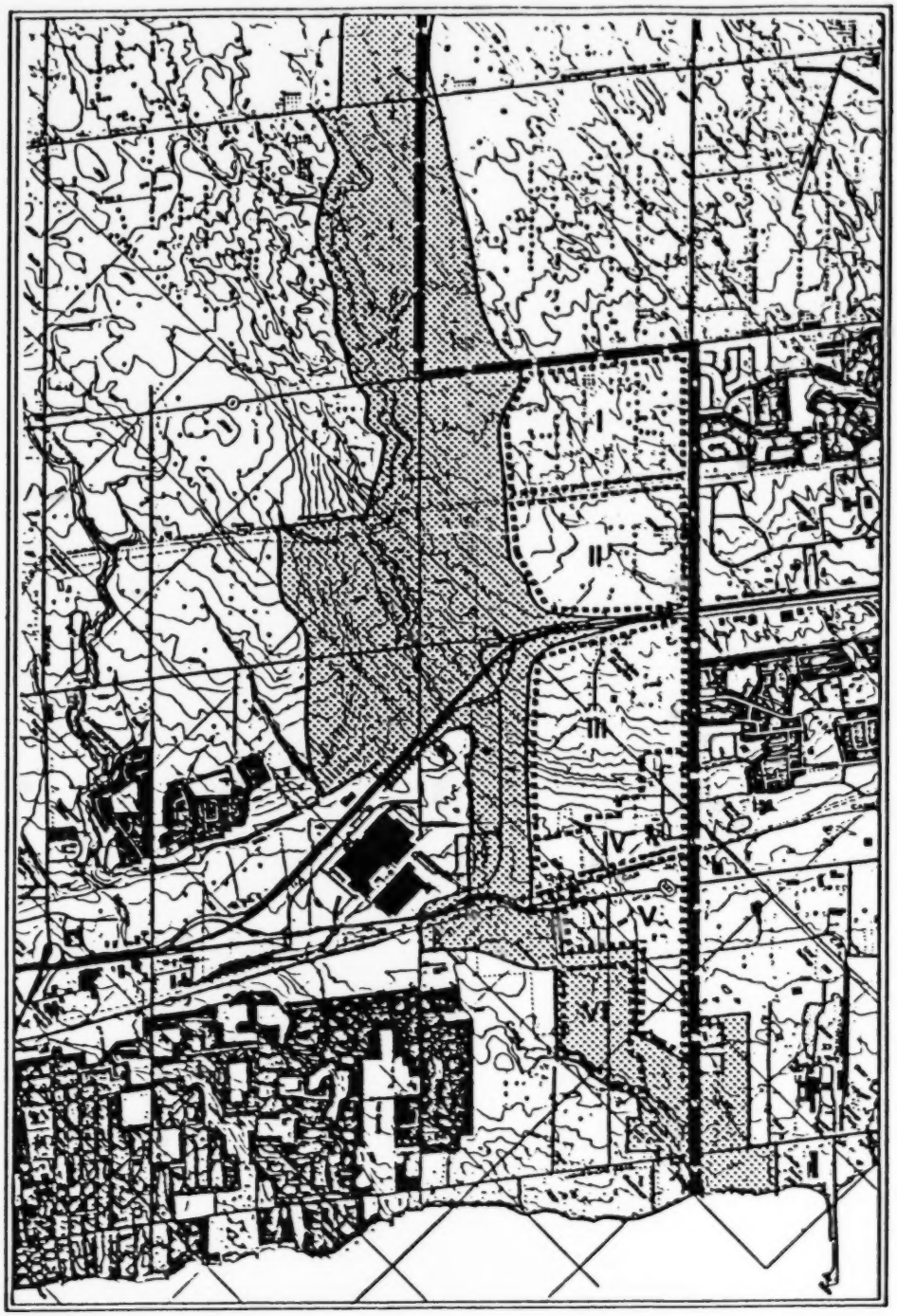
1.2 Terms of Reference

The Terms of Reference outlined in a letter from Gore & Storrie Limited dated May 6, 1980 and amended in a letter from the Region dated May 27, 1980 are summarized as follows:

1. The study area shall be bounded by Highway No. 5 on the north, Lake Ontario on the south, Winston Churchill Boulevard on the east and the Oakville, Mississauga Mini-Green Belt on the west.

2. Develop a water distribution system served from the existing Town of Oakville water supply system. A link with the Peel water system shall be investigated as a security provision.

3. Develop sanitary trunk sewer systems to carry the sanitary sewage to the South-East Treatment Plant. Investigate and comment on methods of crossing the Joshua Creek, bearing in mind, recent comments by the Halton Region Conservation Authority.



I North Elgar

II Xerox Property

III Clearview

IV Sheridan Nurseries Property

V Beryl Road Industrial Area

VI Joshuas Creek Estates

LEGEND:

DEVELOPMENT AREAS

PARKWAY BELT WEST

OAKVILLE - MISSISSAUGA TOWN LINE

REGIONAL MUNICIPALITY OF HALTON

TOWN OF OAKVILLE

SOUTH EAST AREA STUDY

DEVELOPMENT AREAS

PLAN No. 1

GORE & STORRIE LIMITED
Consulting Engineers

4. Develop a cost estimate, including all available federal and provincial subsidies, for the staging of the water distribution system and the sanitary sewer system.

5. Liaise with the Town of Oakville and Region planning departments to develop a scheme compatible with present planning. The Region will supply information on planning, up-to-date water reports and sanitary flow data plus any additional information which they may have which may be related to this study.

6. In addition, the effect of the inclusion of approximately 250 acres of land within the Region of Peel coming into the sanitary service area shall be investigated. The Region of Peel will provide Gore & Storrie Limited with all available information regarding future development in this area and the actual peak flow expected at the intersection of Winston Churchill Blvd. and Highway 5.

7. The Engineer shall be responsible for investigating, determining and advising the client whether or not any funding in the nature of subsidies, interest-free loans or otherwise, are available to the client from federal, provincial, municipal governmental authorities, or otherwise, with respect to the project concerned. Where such funding is available to the client, and the client informs the Engineer that such funding shall be applied for, then the Engineer shall be responsible for the preparation and submission of any necessary applications for such funding, and shall also be responsible for making any required representations and carrying on any required negotiations with the authority concerned in order to try and obtain for the client the funding available from that authority on the project concerned.

1.3 Population and Development Projection

For the purposes of this study, the study area has been subdivided into six development areas. These areas are identified on Plan No. 1 opposite and are described as follows:

(i) North Elgar

The lands to the north of the Ontario Hydro right-of-way and below Highway No. 5 are owned by the Elgar Group and have been designated as industrial lands. The approximate area of the lands zoned to be developed is 148 hectares.

(ii) Xerox Property

The Xerox property is located south of the Ontario Hydro right-of-way and north of the Queen Elizabeth Way. This property is designated industrial and is approximately 119 hectares.

(iii) Clearview

The Clearview lands have been zoned for combined industrial and residential use. These lands are located south of the Queen Elizabeth Way, east of the Parkway Belt and north of the Sheridan Nursery property.

There are three major owners in this development - 281990 Ontario Limited, Elgar Properties Limited and Pinetree Development Company Limited. For the 281990 Ontario Limited property a draft plan of a sub-division has been approved by the Town of Oakville council on November 5, 1979. For the Elgar Properties Limited and Pinetree Developments Company Limited a draft plan of a sub-division has been approved by the Town of Oakville council on November 19, 1979.

The schedule of land use for these properties is as follows:

	281990 Ontario Limited		Elgar Properties Limited Pinetree Developments Co. Ltd.	
Type	Area	Units	Area	Units
Residential				
Single Family	9.65 ha	193	37.19 ha	687
Semi Detached	1.93 ha	44	14.19 ha	364
Linked Townhouses	1.38 ha	26	1.17 ha	48
Cluster Housing	3.36 ha	50		
Schools			4.05 ha	
Parks and Walkways	1.67 ha		8.06 ha	
Commercial			1.70 ha	
Future Residential	0.10 ha		0.36 ha	
Future Industrial			12.11 ha	
Industrial	2.16 ha			
Buffer and Open Space	1.69 ha		7.82 ha	
Day Care/Church			0.61 ha	
Roads	6.27 ha		25.10 ha	
Totals	**28.21 ha**	**313**	**112.36 ha**	**1099**

In total the proposed Clearview development will cover 140.57 hectares and have a total of 1412 units. Of the proposed new development area 126.30 hectares will be residential and 14.27 hectares will be industrial.

At the present time there is an existing residential development of approximately 7.18 hectares with a capacity of 60 single family units.

In total the residential development in this area will be 133.48 hectares with a total of 1472 units. Based on approximately 3.6 persons per unit as used by the Regional planning staff it was assumed that the population for the area would be approximately 5340 persons. This results in a population density of approximately 40 persons per hectare.

Based on the distribution of dwelling units we have assumed that 64% or 3418 persons will live in single family dwellings and 36% or 1922 persons will live in semi-detached, linked townhouses or in cluster housing.

(iv) Sheridan Nurseries

The Sheridan Nurseries property is located south of the proposed Clearview development and north of the Canadian National Railways property. The approximate area of the lands to be developed is 68 hectares.

Recent planning information indicates that 48 hectares of this property will be for residential use and the remaining 20 hectares will be used for industrial use. Based on planning data it was assumed that the population density in the residential area is 37 persons per hectare resulting in a design population for the area of approximately 1775 persons.

(v) Beryl Road Industrial Lands

The Beryl Road industrial park is located south of the Canadian National Railway main line tracks, west of Winston Churchill Boulevard and north of Joshuas Creek Estates property. The major owners of this area are Sheridan Nurseries and H.A. Orr.

The total area for development is approximately 92.3 hectares. Of this total approximately 62 hectares are located north of the Interprovincial Pipeline easement and 30.3 hectares are located south of the Canadian National Railways right-of-way.

The area is presently zoned to be entirely industrial.

(vi) Joshuas Creek Estates

This property is located north of Joshuas Creek, south of the Interprovincial Pipelines easement, west of the Hydro Electric Power Commission right-of-way and east of the future Ford Drive. This land is owned by George Wimpey Canada Limited. Although this land is presently within the Parkway Belt, it has been released for development under the complementary use guidelines.

The proposed land use for this area is as follows:

Type	Units	Area
Single Family Residential	242	17.76 ha
Public School		1.60 ha
Parkland		9.37 ha
Open Space		10.30 ha
Ford Drive		0.94 ha
Reserved by Owners		0.07 ha
Roads		6.02 ha
Total	242	46.06 ha

The 10.30 hectares of open space land is essentially the lands occupied by Joshuas Creek. As a result the effective area of development is 35.76 hectares.

Based on planning data it was assumed that the population density would be 25 persons per hectare resulting in a design population of approximately 900 persons.

1.4 Summary of Development

The study area, with respect to assumed development, is summarized as follows:

Development Area	Industrial Area	Residential Area	Residential Population
(i) North Elgar	148.00 ha	--	--
(ii) Xerox Property	119.00 ha	--	--
(iii) Clearview	14.27 ha	133.48 ha	5340
(iv) Sheridan Nurseries Property	20.00 ha	48.00 ha	1775
(v) Beryl Road Industrial Lands	92.30 ha	--	--
(vi) Joshuas Creek Estates	--	46.06 ha	900
Total	393.57 ha	227.54 ha	8015

SECTION 2

SANITARY SEWERAGE SYSTEM

2.1 General

Two possible main trunk sanitary sewer routes were investigated. These are the South East Area Trunk Sanitary Sewer and the Winston Churchill Boulevard Trunk Sanitary Sewer, as is shown on Plan No. 2. Each sewer was designed in accordance with the Design Criteria for Sanitary Sewers of the Regional Municipality of Halton, assuming the zoning characteristics of the six development areas previously mentioned in this report.

In accordance with the terms of reference, the effects of including an area within the Regional Municipality of Peel in each of the proposed sanitary sewer systems was also investigated. The area consists of approximately 100 hectares of residential development north of Highway No. 5, west of Winston Churchill Boulevard. Although we did not receive any formal information regarding future development in the area, we determined a peak flow using the Region of Peel's sanitary sewer design criteria.

2.2 Alternative No. 1
South East Area Trunk Sanitary Sewer

The proposed route of this trunk sewer is shown on Plan No. 2. North of the Queen Elizabeth Way, the proposed sewer is routed along Winston Churchill Boulevard to allow service of the North Elgar and Xerox properties. This land drains to the south east and we have assumed the local sanitary sewers would be laid in this direction. As plans for the area develop in the future and the location of the arterial roads are determined, the proposed sewer alignment may have to be reviewed to suit the available right-of-way. We have assumed that the sewers servicing the area north of the Queen Elizabeth Way will not be constructed prior to the acceptance of development plans for the service area.

In the event that the Region of Halton agrees to provide sanitary services to approximately 100 hectares of land north of Highway No. 5 and west of Winston Churchill Boulevard, the trunk sewer may have to be extended north to this area prior to the development of the North Elgar and/or the Xerox properties.

The sanitary sewer which is to serve the industrial area north of the Queen Elizabeth Way has a minimum size of 300 mm in accordance with the Region of Halton standards.

Within the South East Trunk Sanitary Sewer we have proposed a crossing of the Queen Elizabeth Way at Clearview Drive. This crossing would be tunnelled and could be a common crossing point with other municipal services. As can be seen on the proposed profile of this sewer shown on Plan No. 3, the depth of the sewer is quite deep in this location, however, the deep section is not long.

We have examined the proposed street pattern and the existing contours in the Clearview neighbourhood. The proposed trunk sewer may be constructed along the alignment of the future Clearview Drive.

We have assumed that the trunk sewer can be constructed in future roadways or negotiated easements through the Sheridan Nurseries property south to the Canadian National Railway tracks.

We have proposed a crossing of the Canadian National Railway tracks near an existing culvert and then south along the west limit of the existing Hydro Electric Power Commission right-of-way to the northern limit of the proposed Joshuas Creek Estates development.

At this point, the sewer would enter the development through a proposed walkway and then south along proposed Street 'D' to proposed Street 'B'. At this intersection the trunk sewer could be routed to several alternative crossing locations and schemes at Joshuas Creek. These will be discussed in Section 2.4 of this report.

If easements or other planning difficulties are encountered or anticipated as noted above with this alignment the route can change in several locations to an alignment along Winston Churchill Boulevard.

2.3 Alternative No. 2
Winston Churchill Boulevard Trunk Sanitary Sewer

As shown on Plan No. 2, this proposed sewer is routed entirely along Winston Churchill Boulevard. For that section of the sewer north of the Queen Elizabeth Way, all of the descriptions previously mentioned pertaining to the section under Alternative No. 1 applies.

Since the major portion of the study area lands drain to the south-east, we have assumed that the sanitary sewers within each development would be laid accordingly. The flows from the lands north of the Queen Elizabeth Way were assumed to enter the system at two points along the trunk sewer. The North Elgar property was assumed to drain into the system north of the Hydro Electric Power Commission easement. The Xerox property was assumed to drain into the system north of the Queen Elizabeth Way. South of the Queen Elizabeth Way the flows from the Clearview and Sheridan Nurseries lands were assumed to enter the system south of the Canadian National Railway main line. This would require the construction of a sub-trunk from the existing culvert crossing the Canadian National Railway main line west of Winston Churchill Boulevard south to Beryl Road and east to the trunk sewer. This sub-trunk would serve some of the industrial lands south of the Canadian National Railway main line near Beryl Road. The flows from Joshuas Creek Estates and the adjacent industrial area to the east were assumed to enter the system just north of the creek near Winston Churchill Boulevard.

A preliminary profile of this sewer is presented on Plan No. 4.

One major advantage of the alternative is that the trunk sewer can be constructed independently of the order of development. A disadvantage of this alternative is that at Joshuas Creek the gravity crossing schemes are limited to a crossing near Winston Churchill Boulevard.

2.4 Joshuas Creek Crossing

2.4.1 General

The Halton Region Conservation Authority (H.R.C.A.) have been contacted for their input to the problems of crossing Joshuas Creek. The H.R.C.A. has given their approval to either of two proposed crossings - one at Lakeshore Road and Joshuas Creek, the other at the existing dam site on the creek south of the proposed Joshuas Creek Estates development. A copy of a letter from the H.R.C.A. regarding crossing of Joshuas Creek is appended to this report.

2.4.2 Lakeshore Road Crossing

Implementation of the Lakeshore Road creek crossing will require the construction of a pumping station and forcemain for the entire study area. The pumping station will have a peak flow capacity of 0.54 m^3/sec. The estimated cost of this pumping station and forcemain is approximately $ 1,075,000 including an allowance for engineering and contingencies. The estimated cost of the gravity sewer from Joshuas Creek Estates to the pumping station site is approximately $ 310,000 . Thus, the total estimated cost of this crossing is approximately $ 1,385,000.

In addition to the capital cost of constructing the pumping station and forcemain, the Region would be faced with long term energy costs of such a facility plus additional expenditures normally associated with the operations and maintenance of sewage pumping stations.

The pumping station would require a building lot for the pumping station and possibly an environmental impact study. The sewer and forcemain could be constructed within the Winston Churchill Boulevard and Lakeshore Road rights-of-way. Easements and the co-operation of abutting landowners would be required to carry the sewer from the Joshuas Creek Estates Development to the pumping station site.

2.4.3 Dam Crossing

Crossing the creek at the dam site creates a problem in servicing of the portion of the study area adjacent to Joshuas Creek along Winston Churchill Boulevard. Thus, a small pumping station and forcemain would be

required to service this area. The pumping station could discharge into a sub-trunk sewer in the Joshuas Creek Estates and drain to the north side of the creek crossing at the dam site.

The estimated cost of this pumping station and forcemain is $255,000. As noted previously the Region would also have to pay for long term operation and maintenance costs.

A small building lot would be required for the pumping station and an easement and co-operation from abutting landowners would be required for the forcemain from the pumping station near Winston Churchill Boulevard to the discharge location.

Using the dam site crossing would require extensive restoration costs on Devon Road and Breton Close in order to install the trunk sewer from the creek crossing to the South-East Water Pollution Control Plant.

In addition, the present sewer easement on Breton Close is only 6.10 metres in width and existing houses are located adjacent to this easement. Thus it appears that to construct this alternative the sewer through this easement will have to be relaid using a sewer with enough capacity for the existing and future sewage flows. It is not necessary to install the larger capacity sewer to the water pollution control plant. The estimated cost of the sewer from the Joshuas Creek Estates development to the plant site is $520,000. Thus, the total estimated cost of this crossing is approximately $775,000.

2.4.4 Discussion of Alternatives

As Joshuas Creek is an environmentally sensitive area both of these previously discussed alternatives have the advantage of minimal short term environmental disturbance. Construction of these alternatives should not cause any significant long-term disturbance to the area.

2.4.5 Optional Crossings

In order to reduce the long-term operation and maintenance costs that pumping stations require, the possibility of using gravity flow to

serve the entire study area was examined. We have determined that it is possible to construct a gravity sewer system to serve the entire study area with the exception of one or two houses in the extreme south-east corner of the study area. These houses could be served either by individual grinder pump systems, a small sewage pumping station or remain on the existing septic tanks if this is acceptable.

The crossing location shown on Plan No. 2 near Winston Churchill Boulevard could be common to both the proposed South-East Area Trunk Sewer scheme and the proposed Winston Churchill Boulevard Trunk Sewer scheme. Easements would be required through the lands east of Joshuas Creek Estates to the upstream end of the crossing location. This crossing location is the only location where the Winston Churchill Boulevard Trunk Sewer scheme can cross the creek via a gravity system.

Another alignment that should be considered would have its upstream end at the south eastern corner of the Joshuas Creek Estates property and cross the creek such that the pipe would enter the water pollution control plant site from the north. This alignment would postpone the need to negotiate easements from the present landowners east of the Joshuas Creek Estates. Due to the location of the upstream end of the creek crossing, a pumping station will be required to serve some lands near Winston Churchill Boulevard. A building lot and easements would be required at the time the pumping station would be constructed to serve this land. The timing of the development of this land is not known at this time. The advantage of this alternative is that we understand that an easement may readily be negotiated with the owners of Joshuas Creek Estates for the South-East Area trunk sewer. The Winston Churchill Boulevard Trunk Sewer would likely be delayed due to easement negotiations required for the lands south of Beryl Road.

The crossing of the creek in either of these locations may be made by three alternative methods. These are as follows:

(a) Inverted siphon constructed by open-cut techniques
(b) Inverted siphon constructed by tunnelling techniques
(c) Aerial sewer constructed on piers across the valley

Each of these alternative crossing methods has its advantages. The inverted siphon by open-cut would be the least expensive, the inverted siphon constructed in a tunnel would do the least damage to the environment, and the aerial sewer is the most desirable hydraulically while not causing excessive damage to the environment during construction. A pedestrian walkway could be included in the design of aerial sewer for the benefit of the public. This cost however, is not included in these estimates.

There are certain disadvantages to each of these alternatives. The inverted siphon constructed in open-cut would require the most restoration on completion, tunnelling the siphon would be more costly than open-cut methods and aerial sewer would require a well planned design to be pleasing aesthetically and would require the incorporation safeguards for the protection of the public.

The estimated costs of each of the crossing methods are as follows:

(a) Siphon - open-cut - $150,000
(b) Siphon - Tunnelled - $400,000
(c) Aerial Sewer - $225,000

These three alternative crossing techniques will work for any intermediate crossing location between Winston Churchill Boulevard and the dam site. However, as the crossing location is moved upstream, servicing the houses and industrial areas along Winston Churchill Boulevard becomes more difficult. As stated previously for the Winston Churchill Boulevard Trunk Sewer only a crossing near Winston Churchill Boulevard will permit full gravity drainage.

The residential units that cannot be served by a gravity sanitary sewer service may be served by individual grinder pump systems, be pumped from a central pumping station or be left on septic tanks. Industrial units may require a small pumping station or sumps to handle the larger flows.

The costs for the South East Area Trunk Sewer for the alternative crossing locations are shown as follows. These costs assume the crossing is made via a siphon constructed in open cut.

JOSHUAS CREEK CROSSING

Comparative Estimated Costs

Crossing Location	Component Cost			Total Estimated Cost
	Pumping Station and Forcemain	Collector Sewer	Sewer to W.P.C.P.	
Lakeshore Road	$ 1,075,000	$ 310,000	--	$ 1,385,000
Dam Site	$ 255,000	--	$ 520,000	$ 775,000
Near Winston Churchill Boulevard	--	$ 310,000	$ 365,000	$ 675,000
North of W.P.C.P.	$ 255,000	--	$ 505,000	$ 760,000

NOTES: 1. All estimates assume a crossing installed using normal open cut methods

2. The costs of easements have not been included

Crossing Location	Total Estimated Cost
Lakeshore Road	$1,385,000
Dam Site	775,000
Near Winston Churchill Boulevard	675,000
North of W.P.C.P.	760,000

The costs of the component parts of these crossings are shown on the table opposite

2.5 Servicing Additional Area in the Region of Peel

The Region of Halton was requested by the Region of Peel in a letter dated April 15, 1980 to investigate the effect of servicing approximately 101.2 hectares of land north of Highway No. 5 within the Region of Peel. We have used the Region of Peel design criteria to determine this flow rate.

The following assumptions were made:

Population Density	-	74.1 persons/hectare
Unit Flow	-	379 litres/capita/day
Peaking Factor	-	$\frac{5}{(P)^{0.2}}$
P	-	Population in thousands
Infiltration Allowance	-	Town of Mississauga Standard - A7907 used by the Region of Peel

Using this criteria the average flow rate was determined to be 5.4 ML/day and the peak flow rate was determined to be 12.1 ML/day. This peak flow rate was added to the flows obtained for the study area using the Design Criteria for Sanitary Sewers of the Regional Municipality of Halton for the purposes of the trunk sewer design.

In order to compare the trunk sewers sizes without the Peel lands and with the Peel lands the following table is presented assuming the dam site crossing of Joshuas Creek is selected: (Refer to Plan No. 2).

Alternative No. 1 - South-East Area Trunk Sewer* (Dam Site Crossing)

Location	Without Peel		With Peel	
	Diameter	Length	Diameter	Length
W.C. Blvd.	300mm	560m	375mm	1320m
" "	375mm	570m	450mm	570m
Clearview Drive	525mm	2580m	600mm	3200m
Sheridan Nurseries	600mm	960m	675mm	340m
Joshuas Ck. Estates	750mm	1270m	825mm	1270m
Joshuas Creek	150,450,525mm	150m	150,450,600mm	120m
W.P.C.P. Site	900mm	610m	975mm	430m

*Pumping Station and Forcemain not affected by inclusion of Peel

Alternative No. 2 - Winston Churchill Boulevard Trunk Sewer (Crossing Creek near Winston Churchill Boulevard)

Location	Without Peel		With Peel	
	Diameter	Length	Diameter	Length
W.C. Blvd.	300mm	560m	375mm	1320m
" "	450mm	690m	525mm	690m
" "	525mm	1870m	600mm	1870m
" "	600mm	880m	675mm	880m
" "	825mm	1250m	900mm	1250m
Joshuas Creek	150,375,525mm	120m	150,375,600mm	120m
W.P.C.P. Site	900mm	430m	957mm	430m

The estimated costs of the trunk sewer alternatives both including and excluding the Region of Peel lands are presented later in this section.

In addition to enlarging the trunk sewer to handle the sanitary sewage from the Region of Peel, the Region of Halton would have to commit approximately 5.4 ML/day of the capacity of the South-East Water Pollution Control Plant to serve the additional lands in the Region of Peel. This represents approximately 23.5% of the present rated capacity of 23 ML/day.

2.6 South-East Water Pollution Control Plant

In 1976 Gore & Storrie Limited submitted to the Regional Municipality of Halton a Report on the Sanitary Sewerage System in the Town of Oakville. In this report it was recommended "that all the sanitary sewage flows in the unserviced areas in Oakville be treated at the western plants with the exception of the area adjacent to Winston Churchill Boulevard and south of

OAKVILLE SOUTH-EAST AREA STUDY

SANITARY TRUNK SEWER

ESTIMATED COSTS

Description	Diameter (mm)	Length (metres)	Estimate Cost	
Alternative I				
South-East Area Sanitary Trunk Sewer				
North of Q.E.W.	300	560	$ 105,000	
	375	570	140,000	
	525	850	295,000	
Q.E.W. Crossing	Tunnel 1650	64	110,000	
Clearview	525	1730	535,000	
Sheridan Nurseries-Industrial	600	960	315,000	
C.N.R. Crossing, Tunnel (jack & boring)		45	45,000	
Beryl Rd. to J.C. Estates	750	370	155,000	
Joshuas Ck. Estates	750	900	370,000	
Siphon	150,450,525	150	150,000	
Connection to S.E. W.P.C.P.	900	610	420,000	
Pumping Station & Forcemain			255,000	$2,895,000
Alternative II				
Winston Churchill Boulevard Sanitary Trunk Sewer				
North of Q.E.W.	300	560	$ 105,000	
	450	690	200,000	
Q.E.W. Crossing			200,000	
To North of C.N.R. main line	525	1870	620,000	
C.N.R. Crossing, Tunnel (jack & boring)		45	45,000	
To South of C.N.R. spur line	600	880	335,000	
To North of Siphon	825	1250	645,000	
Siphon	150,375,525	120	150,000	
Connection to S.E. W.P.C.P.	900	430	215,000	
Total*				$2,515,000

* Total cost for this alternative does not include sub-trunk sewers within the development areas

Inclusion of Region of Peel Area	
Alternative I	$3,355,000
Alternative II	$2,970,000

Highway No. 5 which will be treated at the South-East Plant".

The South-East Water Pollution Control Plant capacity has been recently expanded to 23 ML/day. At present, the population within the service area is approximately 21,000, which includes a number of homes served by private septic tanks. Average sewage flows presently treated at this plant are about 9.5 ML/day.

We estimate that the 23 ML/day plant capacity will be sufficient for a service population of about 41,600 people, based on an average flow of 545 L/c/d. However, excessive industrial flow from north of the Queen Elizabeth Way could significantly increase the average per capita flow rate, thus reducing the serviceable population of the existing plant capacity.

Although the sewers have been sized for the Region of Halton standard design flows, we recommend that any consideration of expanding the South-East Water Pollution Control Plant be dependent on the actual flows experienced. Allowing for the expected rates of development there should be sufficient time to plan any extensions before they are required.

Allowing for increased flows due to development within the present service area and the possible additional industrial flows, the present site and outfall capacity are considered adequate for the service area.

Whether or not to include the lands within the Region of Peel is a matter of negotiations between the Region of Halton and the Region of Peel. However, we would note that the addition of these flows would significantly reduce the present effective hydraulic capacity of the South-East W.P.C.P.

2.7 Conclusions and Recommendations

The estimated costs of the two alternative trunk sewers are presented on the table opposite. The estimated costs of the two alternatives are also shown if the Region of Peel lands are included in the service area.

We recommend that the Region select Alternative No. 1, the South-East Area Trunk Sewer as the means of providing sanitary services to the study area. This route is more economical than the Winston Churchill Boulevard sewer as collector sewers do not have to be constructed through

the development areas. For estimating purposes we have assumed that easements may be negotiated through the development areas. Easement costs have not, however, been included. These estimates have assumed the Joshuas Creek crossing will be installed as an open cut inverted siphon.

We recommend that the Region construct the siphon across Joshuas Creek using open cut techniques subject to necessary environmental investigations and approvals.

We have concluded that due to the environmental investigation required for crossing other than those already approved by the H.R.C.A. the time and costs of such an environmental investigation would be significant. Also the result of the study may indicate that these crossings are not feasible due to environmental concerns. Providing trunk sanitary sewer services to this area has some urgency and on this basis we recommend that the dam site crossing be selected as the site of the Joshuas Creek crossing.

The Ontario Ministry of the Environment provides 15% grants toward the capital cost of major components of communal sewage works including treatment facilities, outfall and trunk sanitary sewers and associated pumping stations. Priority is given to works providing for an increased supply of serviced lots in growth areas, thus the Region of Halton is in a good position to benefit from this program for the construction of the South-East Area Trunk Sewer.

SECTION 3

WATER SUPPLY

3.1 General

The purpose of this section is to outline the options and recommendations for supplying the study area with water. We have investigated a system of feedermains and primary distribution mains only. It has been assumed that the local distribution mains will be supplied and installed by the individual developers.

The Terms of Reference required the development of a water distribution system served from the existing Town of Oakville water supply system. A link with the Peel Water System should be investigated as a security provision.

3.2 Existing and Proposed Developments

The study area is presently undeveloped with the exception of the existing community on Clearview Drive. The lands north of the Queen Elizabeth Way have been zoned industrial and the lands south of the Queen Elizabeth Way have been zoned as industrial and residential development. There is presently no distribution system in the area with the exception of small service lines from the Peel Regional Water System to the nurseries and industries along Winston Churchill Boulevard and Beryl Road.

3.3 Previous Studies

James F. MacLaren Limited prepared a report on the Oakville Water Distribution System in 1973 in which they recommended sizes and locations for feeding the study area. The impact of the Parkway Belt plan was not evident at the time of the report.

In 1977 Gore & Storrie Limited submitted a draft report to the Region of Halton entitled "The Town of Oakville South East Area Study - Storm,

Sanitary and Water Servicing". This report recommended sizes and approximate locations of watermains to serve this study area. At the time of submission of that report the Parkway Belt was in existence however its configuration has changed somewhat since that time.

Marshall, Macklin, Monaghan Limited prepared a report in 1979 entitled "A Report on the Study of the Oakville Water Distribution System for Alternate Development Concepts". In that study the distribution system was analyzed for four development alternatives. Generally the "Trends Concept" discussed in that report represents the land use in the study area that is being investigated in this report.

The Marshall, Macklin, Monaghan Limited report has adopted the distribution system in the 1977 draft Gore & Storrie Limited report.

In order to ensure similarity between reports, we have adopted the basic assumptions with respect to water demand per capita as used in the 1979 Marshall, Macklin, Monaghan Limited report.

In 1981, Simcoe Engineering Limited prepared a report on the Town of Oakville water distribution system. We have discussed the water distribution system with Simcoe Engineering Limited to ensure compatibility of this report with the overall report on the water distribution system.

3.4 Basic Design Data

The land use assumed for the study area has been discussed previously in Section 1 of this report.

In residential area the water consumption rates used were those as used in the 1979 report prepared by Marshall, Macklin, Monaghan Limited. These consumption rates are as follows:

Land Use Category			Consumption
Res 1	-	low density singles	255 L/c/d
2	-	low density multiples	280 L/c/d
3	-	high denisty apartments	320 L/c/d
Com 1			56 m^3/ha/d
2			39 m^3/ha/d
3			25 m^3/ha/d
Ind 1			12 m^3/ha/d
2			4710 m^3/d
Community Service			10 m^3/ha/d

These consumption rates can be applied to the study area to determine the average daily water consumption.

	Development Area	Land Use	Area ha	Population R1	Population R2	Average Day Consumption m^3/d
(i)	North Elgar	Ind 1	148.00	--	--	1776
(ii)	Xerox	Ind 1	119.00	--	--	1428
(iii)	Clearview	Ind 1	14.27	--	--	171
		Res 1	--	3418	--	872
		Res 2	--	--	1922	538
(iv)	Sheridan	Res 1	--	1775	--	453
		Ind 1	20.00	--	--	240
(v)	Beryl Road	Ind 1	92.30	--	--	1108
(vi)	Joshuas Creek	Res 1	--	900	--	230
	Total		393.57	6093	1922	6816

From the above data we have adopted maximum consumption rates for the study area based on coefficients relating peak demand to average day consumption. These coefficients have been derived from experience and the characteristics of the local distribution system in Oakville. The peak morning hour industrial flow rate is derived from the total number of hours in the week (168) divided by the average usage time (50 hours) in a week assuming a one shift industry.

All of the coefficients adopted have been selected to yield the maximum possible demand and are reasonable.

The following table shows the derived maximum water demand:

Development Area	Average Day Consumption	Maximum Daily Rates					
		Daily		Morning Hour		Evening Hour	
		Coeff	Cons	Coeff	Cons	Coeff	Cons
(i) North Elgar	1776 m^3/d	1.2	2131 m^3/d	4.0	7104 m^3/d	0.3	533 m^3/d
(ii) Xerox	1428 m^3/d	1.2	1714 m^3/d	4.0	5712 m^3/d	0.3	428 m^3/d
(iii) Clearview	171 m^3/d	1.2	205 m^3/d	4.0	684 m^3/d	0.3	51 m^3/d
	872 m^3/d	2.5	2180 m^3/d	1.5	1308 m^3/d	5.0	4360 m^3/d
	538 m^3/d	2.5	1345 m^3/d	1.5	807 m^3/d	5.0	2690 m^3/d
(iv) Sheridan	453 m^3/d	2.5	1133 m^3/d	1.5	680 m^3/d	5.0	2265 m^3/d
	240 m^3/d	1.2	288 m^3/d	4.0	960 m^3/d	0.3	72 m^3/d
(v) Beryl Rd.	1108 m^3/d	1.2	1330 m^3/d	4.0	4432 m^3/d	0.3	332 m^3/d
(vi) Joshuas Crk.	230 m^3/d	2.5	575 m^3/d	1.5	345 m^3/d	5.0	1150 m^3/d
Total	6816 m^3/d		10901 m^3/d		22032 m^3/d		11881 m^3/d

The fire flows according to "Water Supply for Public Fire Protection, A Guide to Recommended Practice, 1977" as published by Insurance Bureau of Canada may be estimated as follows:

Building Type	Consumption	
	Igpm	m^3/day
Residential		
- detached	800 - 1000	5240 - 6550
- townhouse	1200	7860
Industrial	3000	19640
Commercial		
- small open shopping centre	3500	22910

While these flow rates represent the most likely requirements of the system, the actual demand applicable should be determined as the development progresses.

To determine the effect of the fire flow it was assumed that the maximum fire flow would be 22910 m^3/day. This flow must be added to the maximum day demand which would result in a peak supply rate of 33811 m^3/day.

3.5 Pressure Requirements

The water system should be such that the pressures are not less than 28 metres of water during peak rates of consumption. Under conditions of simultaneous maximum day and fire flow demands, the pressure should not be less than 14 metres of water. The maximum pressure should, in general, not exceed 70 metres of water.

3.6 System Operation

3.6.1 Previously Proposed System

In the 1977 draft report prepared by Gore & Storrie Limited it was recommended that the study area be supplied by a single feedermain constructed on Upper Middle Road from the Eighth Line Road Booster Pumping Station. This feedermain would be split into a north leg to the industrial area and a south leg to the Clearview area.

It was also recommended that the system be interconnected with the Peel Water System at the future Queensway and Winston Churchill Boulevard for the purposes of emergency supply.

Since the submission of that report, the Parkway Belt has changed somewhat and residential development is proposed south of Royal Windsor Drive.

3.6.2 Proposed System

The revision to the Parkway Belt since the 1977 draft report has resulted in an increased service area. One of the revisions to the Parkway Belt has permitted the proposed Joshuas Creek Estates. It is our understanding that the owner of Joshuas Creek Estates wishes to construct the development as soon as possible.

The residential Joshuas Creek Estates may be served from the existing Zone 1 distribution system. Service to this area can be provided by extending the adjacent Zone 1 distribution system.

We recommend that the industrial areas south of Royal Windsor Drive be served by the Zone 1 system and the remainder of the study area be served from the Zone 3 system as recommended in our 1977 draft report.

Zone 1

The Joshuas Creek Estates may be served from the existing Zone 1 distribution system which already extends to the west edge of the Estate area. The area of Zone 1 is primarily served by an existing 500 mm diameter feedermain extending easterly from Allan Street on MacDonald Road and Devon Road to Brookmill Road.

We understand that the portion of existing 500 mm diameter feedermain between Allan Street and Morrison Road is an older unlined cast iron pipe. In the 1979 report prepared by Marshall, Macklin, Monaghan Limited a Hazen William "C" coefficient value of 75 was used in the analysis of the distribution system. The "C" coefficient used for the sections of 500 mm diameter pipe was 130. The headloss rate due to friction is approximately three times higher at C = 75 than at C = 130.

The large headloss in the older section of 500 mm diameter main restricts the capacity of the existing distribution system at the east end of the Zone 1 system. The industrial area east and north of the Joshuas Creek Estates development has substantial fire flow requirements that can not be supplied through the existing Zone 1 distribution system at the minimum required pressure. The demands of the industrial lands in the vicintiy of Royal Windsor Drive may not be adequately satisfied because of the increased ground elevation as well as the pressure reduction due to headloss in the pipe.

Even if it is assumed, on a theoretical basis, that the older section of the 500 mm diameter watermain has a "C" value of 100 the results do not change significantly. The industrial area still could not be completely served from the existing Zone 1 system due to pressure losses during maximum day plus fire flow conditions.

It has been suggested that the area east of Joshua Creek Estates and south of Royal Windsor Drive be served by extending the Zone 1 system to this area. This would include all lands up to a ground elevation of 99.0 metres. On September 30, 1980 at 10:00 a.m. fire flow tests were conducted by Gore & Storrie Limited personnel assisted by Region staff. The static pressure at Brookmill and Constance at that time were as follows:

FIRE FLOW TEST RESULTS

Location	Water Pressure m	Hydrant Elevation m	Hydraulic Gradeline m
Brookmill and Constance	30.25	94.35	124.60

The reported water pressure at the water plant at that time was 47.88 metres of water and the reported guage elevation is 78.94 metres. Thus, the hydraulic grade line at the water plant was 126.84 metres.

As a result of these readings, it can be seen that the total headloss between the water plant and Brookmill and Constance was 2.24 metres. Due to the timing of the test, it can be assumed that this was "average day" conditions. From the Hazen-Williams formula if the flowrate doubles the headloss will increase by a factor of 3.61. Thus, during maximum conditions the headloss could be 8.09 metres, resulting in a hydraulic grade line of 118.73 metres at Brookmill and Constance assuming the same hydraulic grade line at the water plant.

Assuming the distribution piping to this additional area has negligible headlosses the static pressures at a ground elevation of 99.0 metres would be as follows:

POTENTIAL STATIC PRESSURE

Condition	Hydraulic Grade Line m	Ground Elevation m	Water Pressure m
Average Day	124.60	99.00	25.60
Maximum Day	118.73	79.00	19.73

These pressures are lower than the Regional standards, however, the situation would be improved with higher supply pressures at the water plant. As noted previously, this Zone 1 system cannot deliver adequate fire flows for industrial demands to this area.

In summary it is possible to serve the area east and north of Joshua Creek Estates on an interim basis from the existing Zone 1 system, however, this system should be considered as low pressure service suitable for average day conditions. When the Zone 3 system discussed herein afterwards is built, this area could be reinforced by the supply to the north and thus be up-graded to Regional standards.

As an interim security measure we would recommend the Region investigate a valved connection to the South Peel water system similar to that proposed for north of the Queen Elizabeth Way.

Zone 3

We recommend that the remainder of the study area, ultimately be served from the Zone 3 distribution system. This recommendation is similar to that recommended in our 1977

draft report. As discussed previously, some areas south of Royal Windsor Drive may be served from Zone 1 on an interi basis.

The flow requirements for this service area are estimated to be as follows:

Average Day	-	6586 m^3/day
Maximum Day	-	10326 m^3/day
Morning Hour	-	21687 m^3/day
Evening Hour	-	10731 m^3/day

If the fire flow requirement is taken as 22910 m^3/day, then the maximum demand would be the maximum day plus fire flow which equals 33236 m^3/day.

We recommend that this area be supplied from the Eighth Line Road Booster Station as shown on Plan No. 5. The Eighth Line Road Booster Station existing characteristics are described below:

Pump No.	Motor Power kW	Pump Capacity m^3/day	Discharge Head kPa	Discharge Head m
1	19	2592	500	51.0
2	56	9504	500	51.0
3	56	9504	500	51.0
4	--	Future	--	--
Total Capacity		21600		
Firm Capacity		12096		

Stand-by Diesel Generator Capacity - 500 kW

The firm capacity of the pumping station is considered as the capacity of the station with the largest pumping unit out of service. To extend service to the study area, the firm capacity of the Eighth Line Road Booster Station will have to be expanded such that its total firm capacity exceeds the peak demand made on the system including the existing and future requirements in other areas.

In the 1979 Marshall, Macklin, Monaghan Limited report, the following flow rates were identified at the Eighth Line Road Booster Station for the existing conditions.

Demand Condition	Flow Rate
Average Day	14461 m^3/day
Maximum Day	23110 m^3/day
Maximum Hour	24690 m^3/day

It can be seen that this pumping station is slightly undersized relative to the predicted water demands. When the fire flow demand is considered the pumping station is presently considerably undersized. If the fire demand is considered to be 22910 m^3/day and this occurs on the existing predicted maximum day the total demand would be 46020 m^3/day. The total capacity of the existing pumping station is 21600 m^3/day.

If the portion of the study area that is proposed to be added to the existing Zone 3 system is added to the existing demand the total demand will be as follows:

	Demand		
Condition	Existing	Zone 3 Study Area	Total
Average Day	14461 m^3/day	6586 m^3/day	21047 m^3/day
Maximum Day	23110 m^3/day	10326 m^3/day	33436 m^3/day
Morning Hour	24690 m^3/day	21687 m^3/day	46377 m^3/day
Evening Hour		10731 m^3/day	
Max. Day + Fire	(33436 m^3/day + 22910 m^3/day Fire)		56346 m^3/day

As can be seen from the preceding table, major modifications to the Eighth Line Road Booster Station are required to serve the proposed Zone III service area of the study area.

We were asked by the Region to investigate the effect on the Eighth Line Road Booster Station and the feedermain to the study area if the land west of the Parkway Belt, east of the Eighth Line Road, south of Highway No. 5 and north of Upper Middle Road, was served by these facilities.

This land has an area of approximately 275 hectares. We assumed a development density of 50 persons per hectare resulting in a design population of 13750 people. We assumed the average day demand would be equivalent to 255 litres per capita per day which corresponds to single family detached dwelling units. Using these criteria and the flow coefficients used

previously the design flows for this area were computed. These demands can be added to the demands in the service area to determine the additional design flows for the pumping station and feedermain. These demands are as follows:

Demand Condition	Study Area Zone 3 Demand	Area West of Parkway Belt	Total
Average Day	6586 m^3/d	3506 m^3/d	10092 m^3/d
Maximum Day	10326 m^3/d	8765 m^3/d	19091 m^3/d
Morning Hour	21687 m^3/d	5259 m^3/d	26946 m^3/d
Evening Hour	10731 m^3/d	17531 m^3/d	28261 m^3/d

If the fire flow requirement is taken as 22910 m^3/day, then the maximum demand would be the maximum day plus fire flow which equals 42001 m^3/day.

Again, if these flows are added to the existing demands, the results would be as follows:

	Demand		
Condition	Existing	Zone 3 Study Area + Additional	Total
Average Day	14461 m^3/day	10092 m^3/day	24553 m^3/day
Maximum Day	23110 m^3/day	19091 m^3/day	42201 m^3/day
Morning Hour	24690 m^3/day	26946 m^3/day	
Evening Hour		28261 m^3/day	52951 m^3/day
Max. Day + Fire	(42201 m^3/day + 22910 m^3/day)		65111 m^3/day

As the total capacity of the pumping station is 21600 m^3/day extensive modifications to the pumping station will be required to bring its firm capacity to 65111 m^3/day plus an allowance for future demands in the area north-west of the existing pumping station.

It is assumed for purposes of this report, that the supply system up to the Eighth Line Road Booster Station has sufficient capacity for future development including the requirements for the south-east study area as outlined herein.

As shown on Plan No. 5, a portion of the area west of the Parkway Belt lies within the Zone 4 pressure zone and as such booster pumping may be required to this area.

The transmission system would consist of a single feedermain constructed on Upper Middle Road from the Eighth Line Road Booster Station to the eastern edge of the Parkway Belt. At the eastern edge of the Parkway Belt we propose that the main be split into a north and south leg. This is shown on Plan No. 5.

It is recommended that the north leg of the feedermain be interconnected with the Peel Water System at the future Queensway and Winston Churchill Boulevard for purposes of emergency supply. This connection will have to be negotiated with Peel Region. The Peel Water System has ample capacity to supply water in case of emergency and the pressure at this point should be compatible with the Oakville system.

The south leg of the feeder system will cross the Queen Elizabeth Way and split into a "loop" through the Clearview area. This pipe may be constructed at a common crossing point with a trunk sanitary sewer. In order to control the system pressure changes due to elevation differences, a number of pressure reducing valves, as shown on Plan No. 5, have been proposed. These pressure reducing valves reduce the Zone 3 pressure into Zone 2 and Zone 1. Zone 2 controls the majority of the residential area while Zone 1 would reinforce the proposed industrial development to the south of Royal Windsor Drive.

The entire service area has no individual balancing or emergency storage either existing or previously proposed. We have, therefore, sized the feedermains for peak flow in order to overcome short term demands within the distribution system.

As alternatives to connecting to the Peel system to accomodate emergencies the Region could construct (1) a pumping station in the South-East Area, (2) revise the Oakville system operation and thus increase the pump head at the Eighth Line pumping station, or (3) add a booster pump to the Eighth Line Road Booster Station for this area alone. Either of the two pumping station alternatives could be accompanied by some form of storage.

These alternatives would be considerably more expensive than the Peel connection and certainly would not offer any greater degree of system security.

3.7 Pressure Zones

The study area lies within the existing pressure Zones 1, 2 and 3. The Joshuas Creek Estates residential development and some adjacent industrial area will be served from the existing Zone 1 system while the remainder of the study area will ultimately be served by the existing Zone 3 system. The study area served by the Zone 3 system must have pressure reducing valves to maintain the pressures in a satisfactory range.

The industrial area north of the Queen Elizabeth Way will be in Zone 3. The area south of the Queen Elizabeth Way and north of the Royal Windosr Drive will be in Zone 3 and Zone 2. The industrial area south of the Royal Windsor Drive will ultimately be served by Zone 1 with reinforcing from the Zone 2 system.

The Marshall, Macklin, Monaghan Limited report designates the top water level (T.W.L.) for Zone 3 as 195 metres. The assumed hydraulic grade line at the Eighth Line Road Booster Station is 203.4 metres. The required hydraulic grade line at the east side of the Parkway Belt is 198 metres. Thus, if the proposed Upper Middle Road feedermain is required to serve additional areas to the study area the Region should ensure that a hydraulic grade line elevation of 198 metres is maintained at this location.

The limiting ground elevations for the proposed pressure zones in the study area are as follows:

Pressure Zone	T.W.L. m	High Ground Elevation, m	Low Ground Elevation, m
3	198	167.6	140.0
2	167	140.0	99.0
1	128	99.0	88.4

The anticipated maximum and minimum static pressures for the zones assuming an H.G.L. of 198 m at the Queen Elizabeth Way, are as follows:

Pressure Zone	Maximum Pressure		Minimum Pressure	
	kPa	m	kPa	m
3	569	58.0	298	30.4
2	667	68.0	265	27.0
1	386	39.4	284	29.0

It is necessary to reduce the above figures to allow for headlosses in each zone. Previously herein, we stated that the minimum required pressure during peak hour flow conditions should be 28.0 metres of water. The minimum pressure at peak hour flows will be obtained if the T.W.L. shown for each zone is maintained. This is most critical in Zone 3 where there are no pressure reducing valves.

The minimum pressure during fire flows on maximum day has been stated previously as 14 metres of water. If industries in some high areas require greater pressures for sprinkler systems then they may find it necessary to install internal fire pumps.

3.8 Proposed Feedermains

The prime supply mains are:

Diameter	Location
750 mm	Along Upper Middle Road from the Eighth Line Road Booster Station to the west limit of the Parkway Belt.
600 mm	Along Upper Middle Road from the west limit of the Parkway Belt to the proposed Queen Elizabeth Way crossing at Clearview Drive.
400 mm	Within Hydro Power Electric Commission right-of-way to Queensway and Winston Churchill Boulevard.
500 mm	Under Queen Elizabeth Way at Clearview Drive.
400 mm	From the Queen Elizabeth Way south to Royal Windsor Drive.

The proposed distribution mains are as shown on Plan No. 5 or an equivalent combination of smaller pipe diameters may be used to obtain the same capacity as those proposed.

We have indicated five pressure reducing valves on the distribution mains to the south of the Queen Elizabeth Way at the proposed pressure zone boundaries. We recommend that each chamber have dual pressure reducing valves in order to provide the desired security in the system.

3.9 Summary of Recommendations

Following our study we have arrived at the following conclusions and recommendations.

1. That the Joshua Creek Estates area be served by the existing Zone 1 distribution system.
2. That the remainder of the Zone 1 system ultimately be reinforced via the Zone 3 system as outlined herein.
3. That a feedermain be installed on Upper Middle Road to supply the remaining service area with the study area. This feedermain can serve the additional lands discussed herein west of the Parkway Belt if the Region wishes to do so. The size of this feedermain shown on Plan No. 5 assumes that this is the case.
4. That the Upper Middle Road feedermain be split into two sub-feedermains supplying the north and south areas and that the north 400 mm feedermain be interconnected with the Peel Region Water Distribution System at the future Queenway and Winston Churchill Boulevard to provide security under emergency conditions.
5. That a 500 mm diameter line be installed beneath the Queen Elizabeth Way to feed the area south of the Queen Elizabeth Way.
6. That from the 500 mm diameter line beneath the Queen Elizabeth Way a 400 mm line be routed down the existing Clearview Drive as shown on Plan No. 5. This line should be connected into two 300 mm diameter lines which would create a loop to allow for phasing in the Clearview subdivision. These 300 mm lines would require pressure reducing valves located at strategic positions to divide the area below the Queen Elizabeth Way into Zone 3 and Zone 2.
7. That a 400 mm diameter line be installed under the Canadian National Railway tracks to service the area on either side of Royal Windsor Drive and to reinforce the Zone 1 system.

8. That the Region review the total future requirements for the Eighth Line Road Booster Station service area and an ultimate pumping scheme be developed with appropriate staging to match the demand as the need arises.

9. That the Region review the consumption rates as the development progresses in order to evaluate the actual long term demands on the system.

3.10 Cost Estimates

The estimated cost of installing the feedermains as proposed is as shown on the table opposite. These estimates are based on current prices available in 1981 and should be escalated as appropriate to account for inflationary trends. An allowance of approximately 15 per cent has been made for engineering and contingencies.

The estimated cost of making alterations to the Eighth Line Road Booster Station should be viewed as an allowance for budgeting purposes. Final estimates would have to result from a detailed investigation of future demands and the condition and arrangement of the existing station.

The Ontario Ministry of the Environment provides 15% grants toward the capital cost of major components of communal water works including storage facilities, trunk feedermains and associated pumping stations. Priority is given to works providing for an increased supply of serviced lots in growth areas, thus the Region of Halton is in a good position to benefit from this program for the construction of this proposed feedermain system.

APPENDIX

THE HALTON REGION CONSERVATION AUTHORITY

TRAFALGAR SQUARE • 310 MAIN STREET • MILTON, ONT. L9T 1P4

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June 27, 1980

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Mr. Norman D. Huggins, P.Eng.,
Project Manager,
Gore & Storrie Limited,
1670 Bayview Avenue,
Toronto, Ontario.
M4G 3C2

Dear Sir:

Re: Alternate Sanitary Sewer Crossings
Joshua Creek, Town of Oakville

Further to our meeting of June 26, 1980, I have had an opportunity to site inspect four alternative locations for the above referenced crossing. The crossing of the Joshua Creek at the existing dam site with the sewer following Devon Road and Breton Close as previously indicated would be acceptable to our staff without the need of any environmental assessment. Similarly, the crossing of the creek immediately north of Lakeshore Road and south of the existing plant with the installation of a pumping station would also be acceptable.

The alternatives of crossing the creek at a location immediately north of the sewage treatment plant or crossing along an alignment following the limit between Lot 1 and 2 in the old concessions would require environmental assessment. Both of these locations are areas where for the most part the creek valley is diversely vegetated.and there are many mature tree and plant species. There unfortunately did not appear upon a cursory inspection to be any obvious crossing points at these locations, where the environmental impact could be kept to a minimum. It was noted however, that the left bank (westerly) of the Joshua Creek has been degraded through the installation of a drainage swale and some apparent filling over the top of bank into the valley. Since this area is in need of rehabilitation, any environmental assessment of alternative routes may look to this area as having some merit because of the condition of the valley wall.

Cont'd...2/

In conclusion, the only method of determining whether a crossing of the creek at the two preferred alternative sites is acceptable is to carry out a detailed review of the two crossing points. This type of review will have to be made by the Region as a requirement under the Town of Oakville's Environmental Protection Area Policies, the Region of Halton's Environmentally Sensitive Areas Policies, and the permit approval process under Ontario Regulation 272/72 by the Halton Region Conservation Authority.

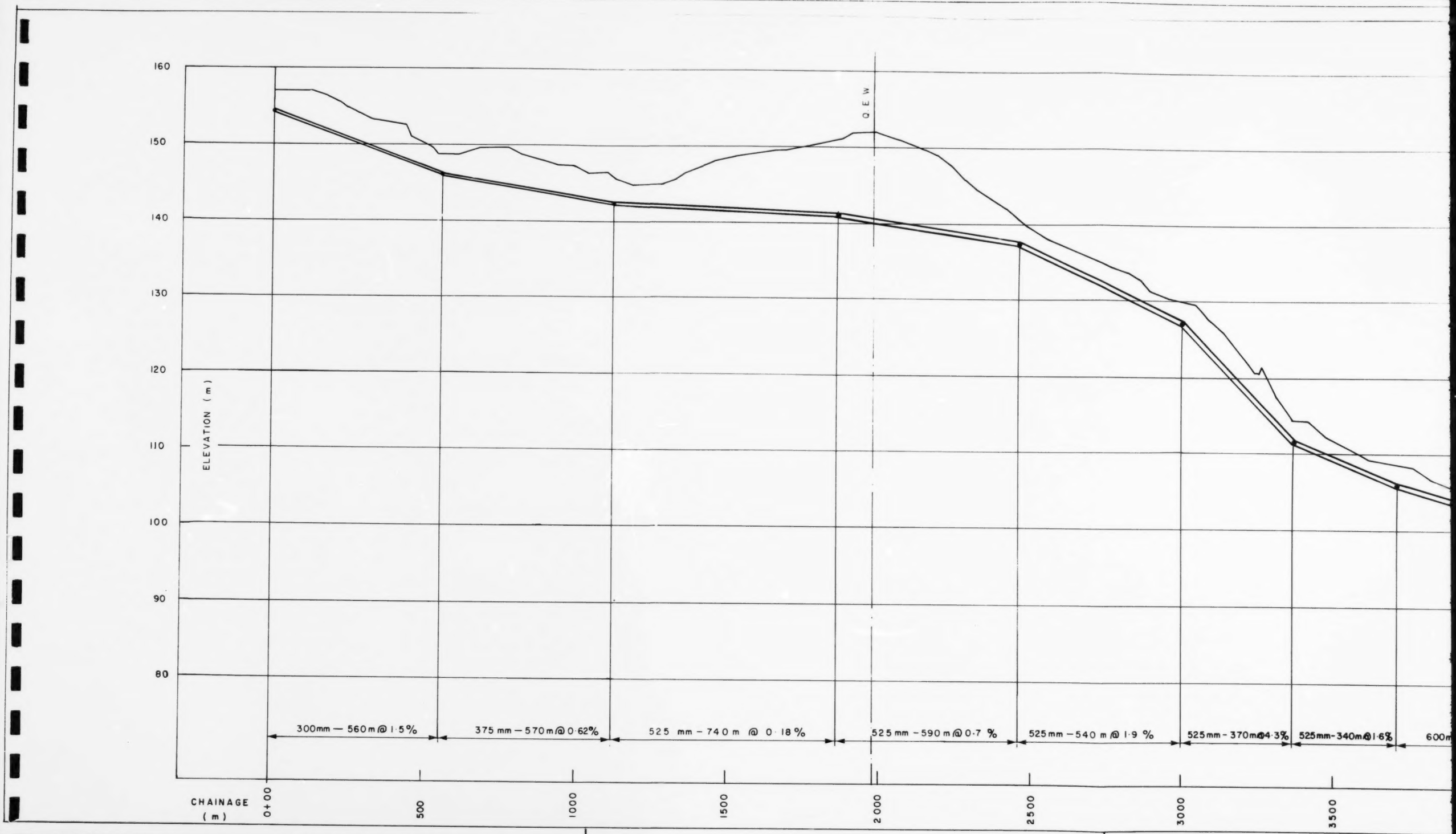
I trust this information is of assistance.

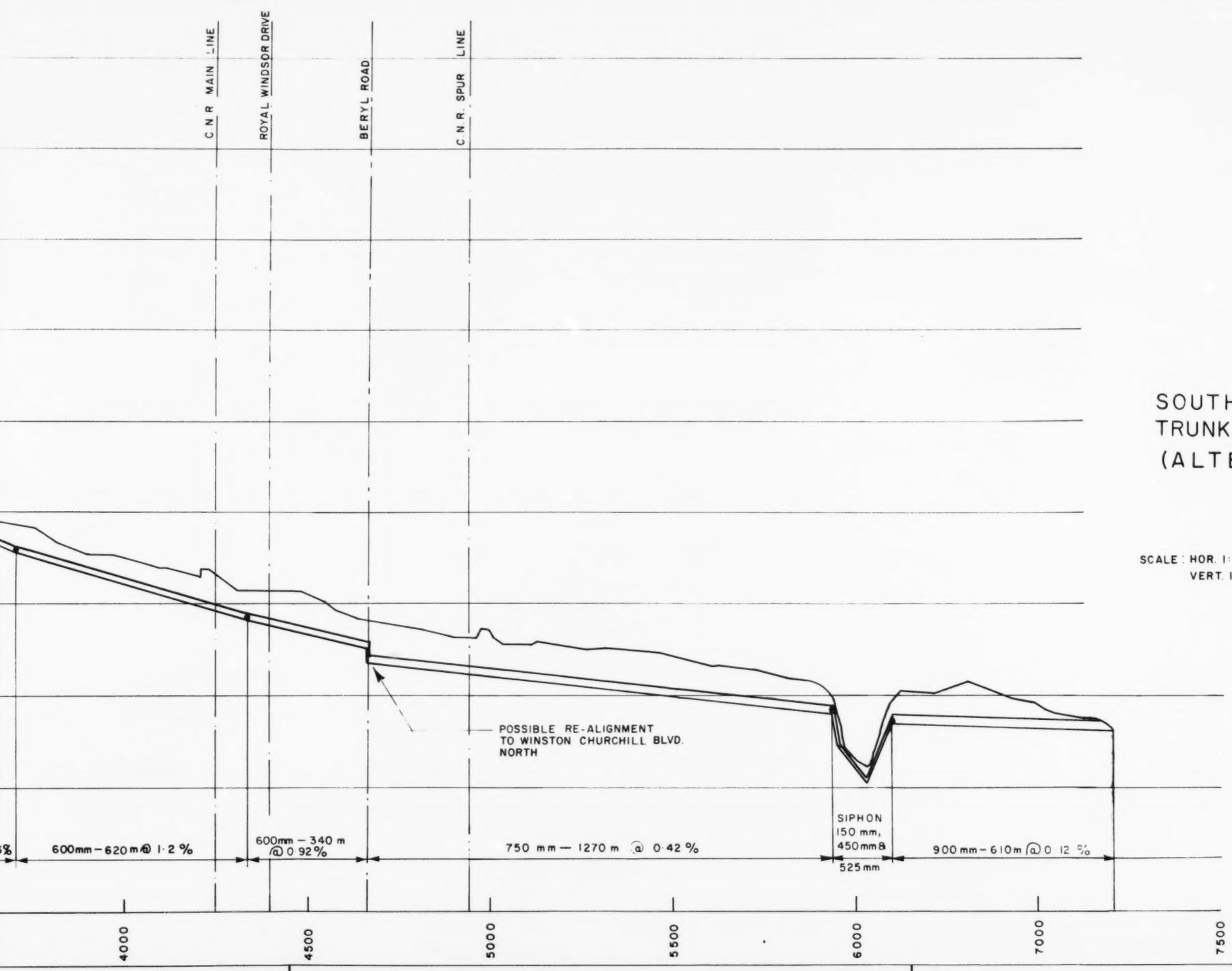
Yours truly,

John D. Hall,
Planner

JDH/cj

c.c. Mr. R. Foy, Town of Oakville
Mr. O.H. Ellis, Town of Oakville
Mr. P. Attack, Region of Halton
Mr. R. Robertshaw, Region of Halton


160
150
140
130
120
110
100
90
80
ELEVATION (m)
Q.E.W
300mm — 560m @ 1·5%
375 mm — 570m @ 0·62%
525 mm - 740 m @ 0·18 %
525 mm - 590 m @ 0·7 %
525 mm - 540 m @ 1·9 %
525mm - 370m @ 4·3%
525mm - 340m @ 1·6%
600m
CHAINAGE (m)
0+00
500
1000
1500
2000
2500
3000
3500



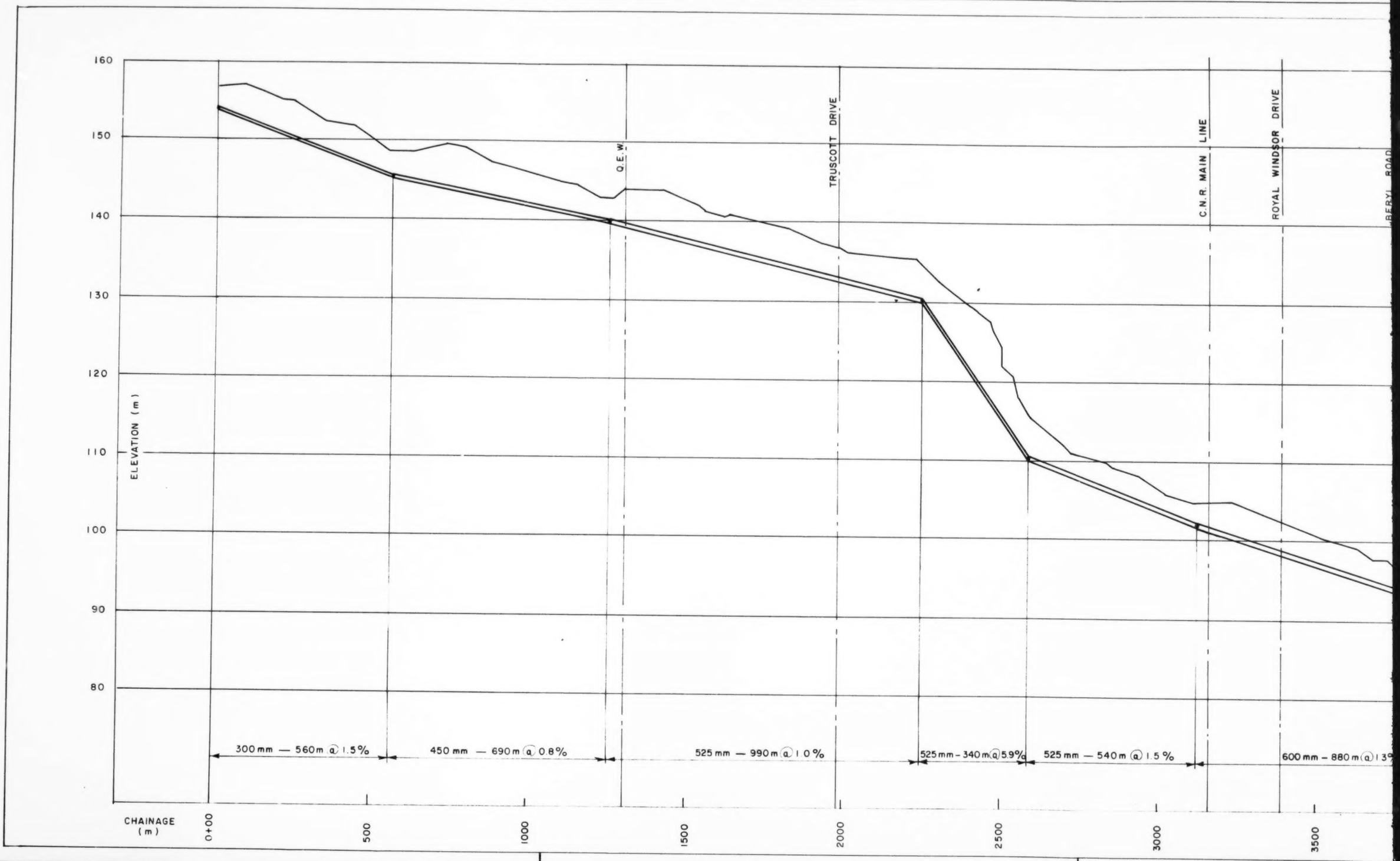
SOUTH EAST AREA TRUNK SEWER PROFILE (ALTERNATIVE I)

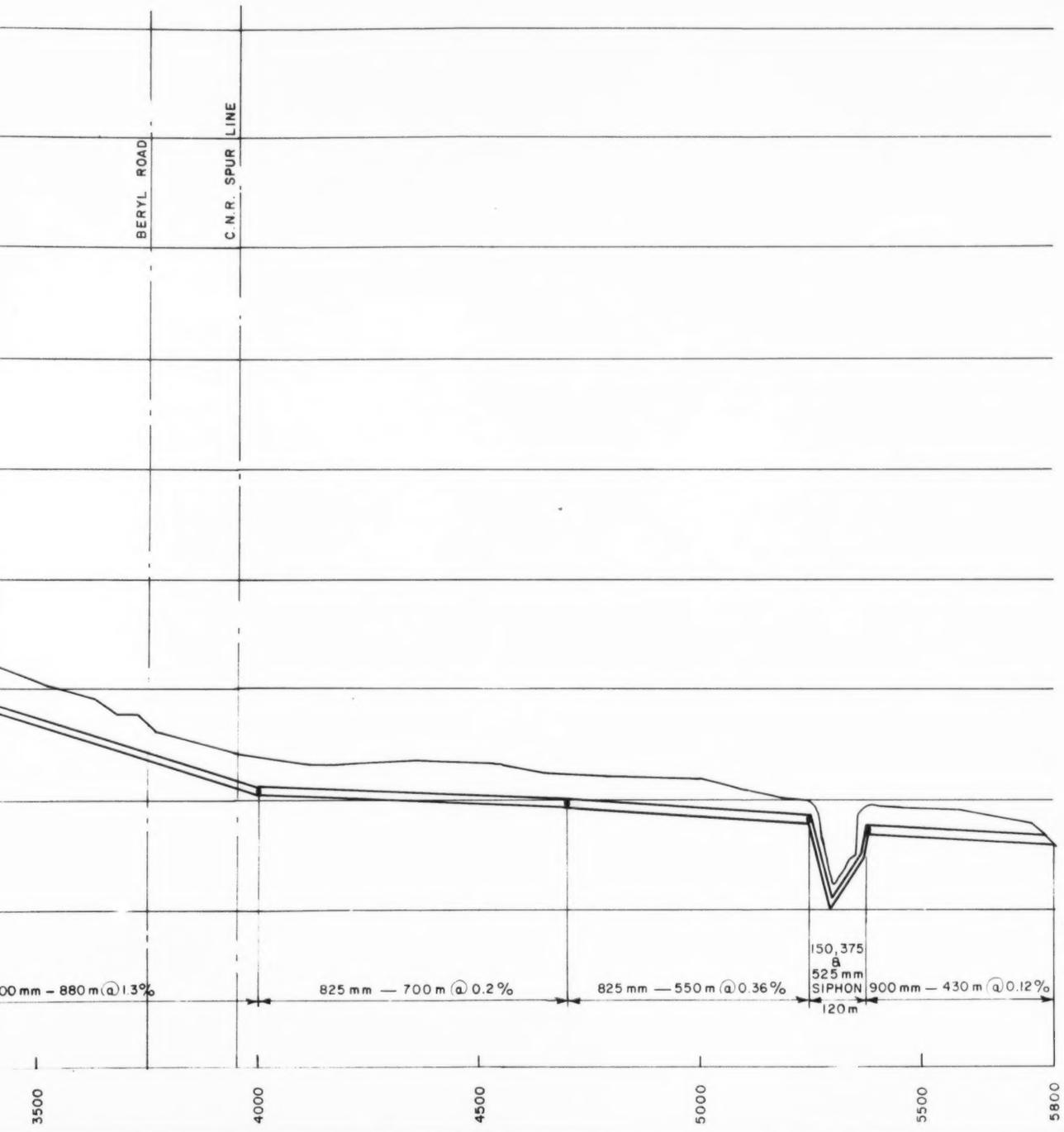
SCALE : HOR. 1:10,000
VERT. 1:400

PLAN No. 3

GORE & STORRIE LIMITED
CONSULTING ENGINEERS

FILE № 485·20 – P – 1130


160
150
140
130
120
110
100
90
80
ELEVATION (m)
Q.E.W.
TRUSCOTT DRIVE
C.N.R. MAIN LINE
ROYAL WINDSOR DRIVE
300 mm — 560m @ 1.5%
450 mm — 690m @ 0.8%
525 mm — 990m @ 1.0%
525mm - 340m @ 5.9%
525 mm — 540m @ 1.5%
600 mm — 880m @ 1.3%
CHAINAGE (m)
0+00
500
1000
1500
2000
2500
3000
3500



WINSTON CHURCHILL BOULEVARD
TRUNK SEWER PROFILE
(ALTERNATIVE II)

SCALE: HOR. 1:10,000
VERT. 1:400

PLAN No. 4

GORE & STORRIE LIMITED
CONSULTING ENGINEERS

FILE Nº 485-20-P-1131

BURNHAMTHORPE ROAD

13 12

Silo

606

600

608

4

Radio

597

580

Snider Ct

595

ZONE III
PEEL
T.W.L. 675

(PEEL)

VARD
ROAD WEST
568
560
550
540
N
Greenhouse
400 mm (PEEL)
Gas Pipeline (underground)
DUNDAS STREET WEST

nsformer

580

12

570

HIGHWAY Nº 5

565

TRAFALGAR

550

Creek

Underground Reservoir

RESERVOIR
Nº 2
T.W.L. 167

EIGHTH LINE ROAD

TRAFALGAR

515

540

Pipeline

Oil

3

520

750 mm

470

490

600 mm

Road

400 mm (PEEL)

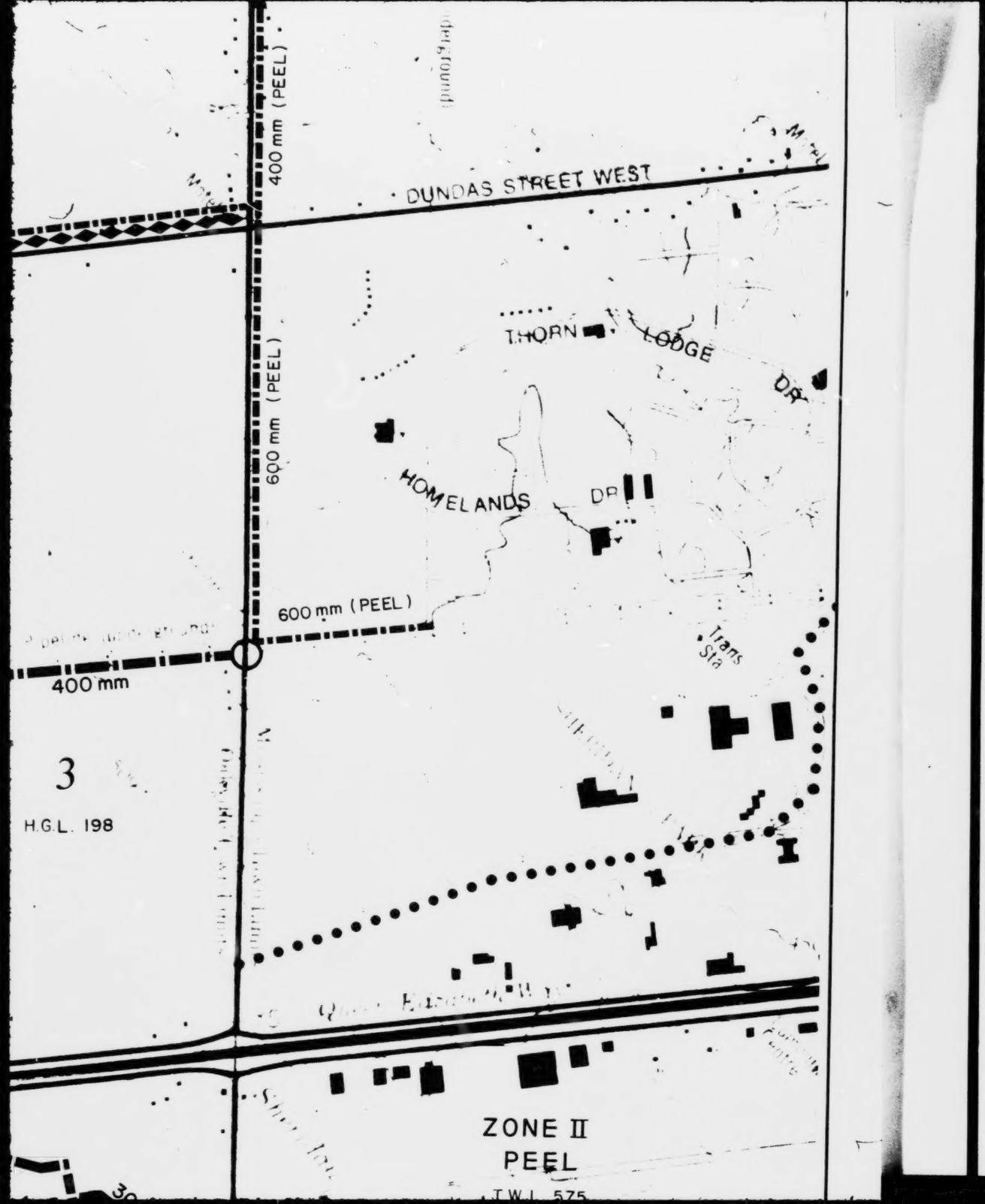
500 mm

3

H.G.L. 1

500 mm

400


400 mm (PEEL)
DUNDAS STREET WEST
THORN
LODGE
DR
600 mm (PEEL)
HOMELANDS
DR
600 mm (PEEL)
400 mm
3
H.G.L. 198
Trans
Sta
ZONE II
PEEL
T.W.L. 575

TRAFALGAR ROAD

LINE ROAD

515

520

750 mm

UPPER MIDDLE ROAD

500

EIGHTH LINE ROAD
BOOSTER STATION

503

HARRINGTON HEIGHTS

Dam

Trans Sta

ROAD

Transformer Station

460

450

II

3

2

Ditch

600 mm

Pool

380

Elizabeth

Factory

Weir

340

RESERVOIR
Nº 1
T.W.L. 128

400

Morrison

750 mm

348

750mm

DAVIS ROAD
BOOSTER STATION

300 mm

PRV

400 mm

300

300 mm

2

H.G.L. I

ROYAL WINDSOR DR.

PRV

300 mm

Tree Nursery

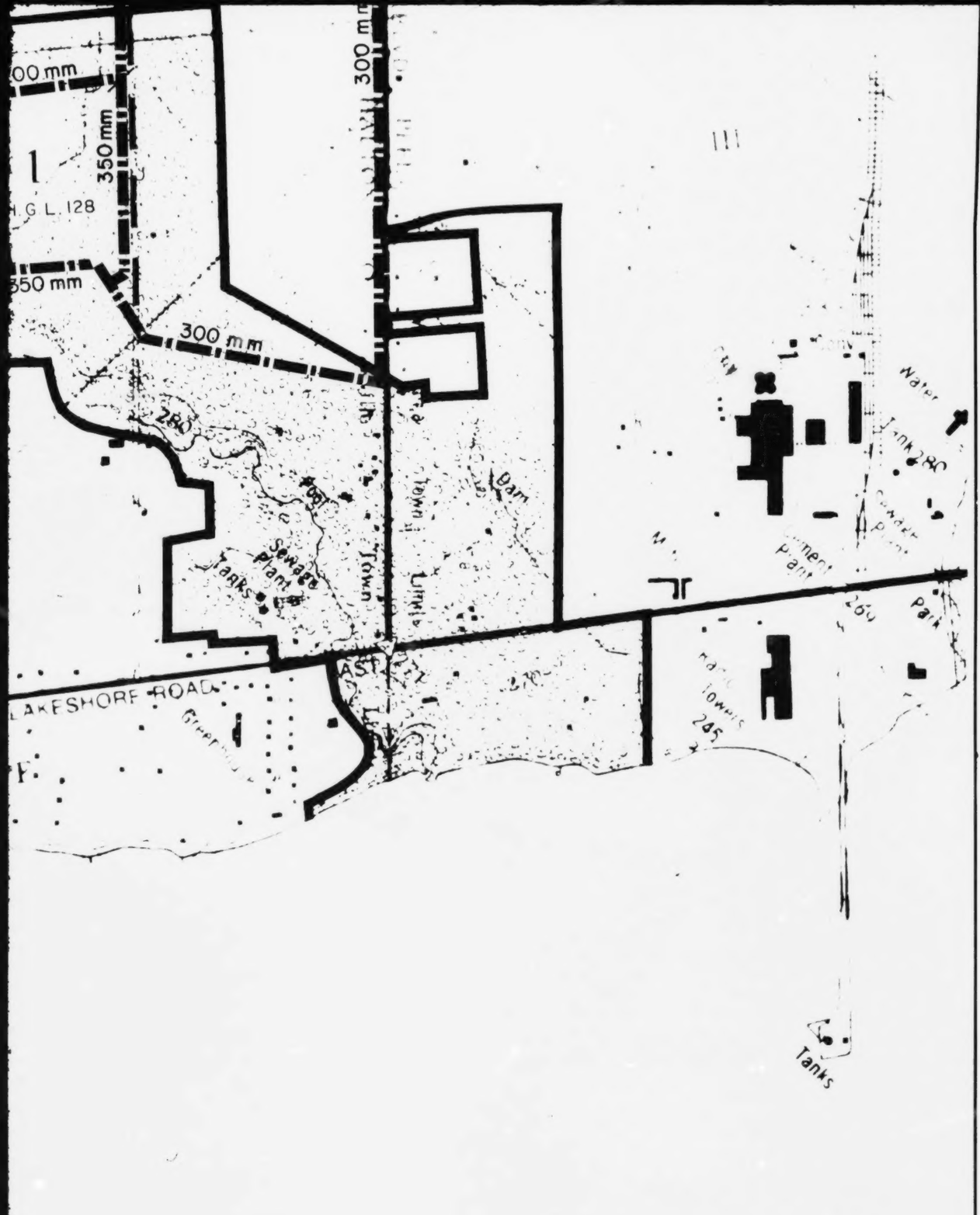
200 mm

350 mm

1

ZONE II
PEEL
T.W.L. 575
300 mm
PRV
300 mm
300 mm
2
H.G.L. 167
300mm
ZONE I
PEEL
T.W.L. 471
PRV
BERYL ROAD
300 mm
300 mm

DAVIS ROAD
BOOSTER STATION
750mm
CNV
320
750 mm
500 mm
DEVON ROAD
Park
Creek
Footbridge
CHARTWELL ROAD
MORRISON ROAD
1
H.G.L.128
NINTH LINE ROAD
Poultry Farm
Tree Nursery
300 mm
200 mm
350 mm
200mm
350mm
500 mm
DEVON ROAD
Creek
1
H.G.L.128
350 mm
300
290
280
250
CNV
HOSP
Sports Track
Curling Rink
ALLAN STREET
900 mm
40 W.PP
Pool
Park
LAKESHORE ROAD
TO B.F.
FNISCLARE
PARK


300 mm
350 mm
300 mm
350 mm
H.G.L. 128
280
Dam
Sewage Plant Tanks
Town
Line
LAKESHORE ROAD
EAST
Water
Sewage Plant
Park
Tanks

BURNHAMTHORPE ROAD W

Silo

606

608

600

Radio

597

nsformer

580

13

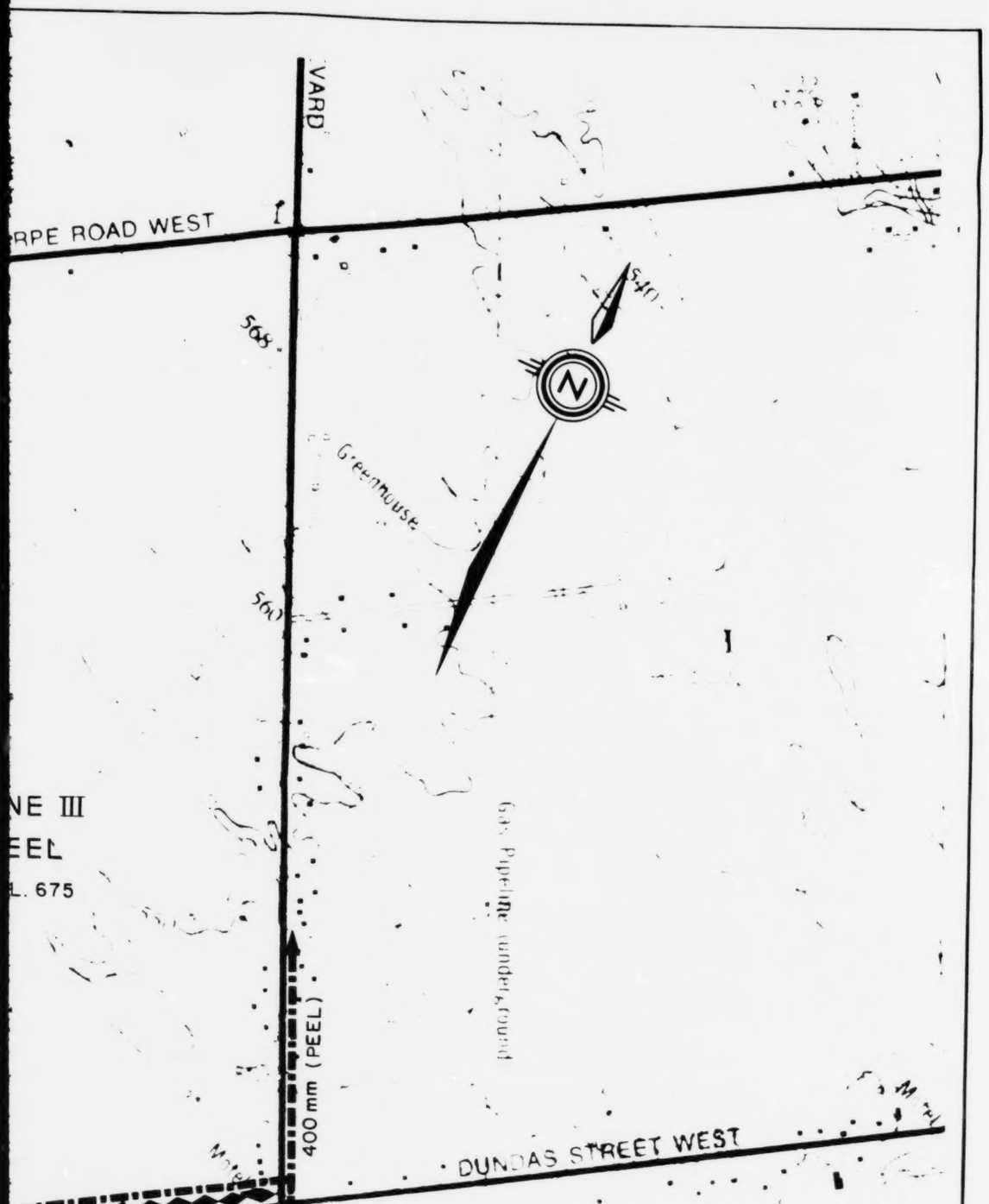
12

4

595

ZONE III
PEEL
T.W.L. 675

100 mm (PEEL)


VARD
RPE ROAD WEST
N
Greenhouse
Gas Pipeline underground
400 mm (PEEL)
DUNDAS STREET WEST
NE III
EEL
L. 675

LEGEND:

Parkway Belt West

Pressure Reducing Valve (PRV)

Interconnecting Valve Chamber

Peel Pressure Zone Boundaries

Existing Water Mains

Proposed Water Mains

Existing Pumping Stations

Existing Reservoirs

Pressure Zone Boundaries

REGIONAL MUNICIPALITY OF HALTON

TOWN OF OAKVILLE

SOUTH EAST AREA STUDY

PLAN
OF
PROPOSED WATER DISTRIBUTION SYSTEM

400m 200

DATE: J

FILE No. 4

Tanks

GORE & STORRIE LIMITED

CONSULTING ENGINEERS

TORONTO, ONTARIO

SCALE = 1:10,000

400 m 200 0 200 400 600 800 1,000 1,200 1,400 1,600

DATE : JULY, 1981

FILE No. 485.20 - P - 1128

PLAN No. 5

nsformer

580

12

570

HIGHWAY Nº 5

565

TRAFALGAR

550

Creek

Underground Reservoir

RESERVOIR Nº 2 T.W.L. 167

EIGHTH LINE ROAD

580

Pipeline

Oil

3

515

520

750 mm

TRAFALGAR

400 mm (PEEL)

500 mm

3

H.G.L. 19

500 mm

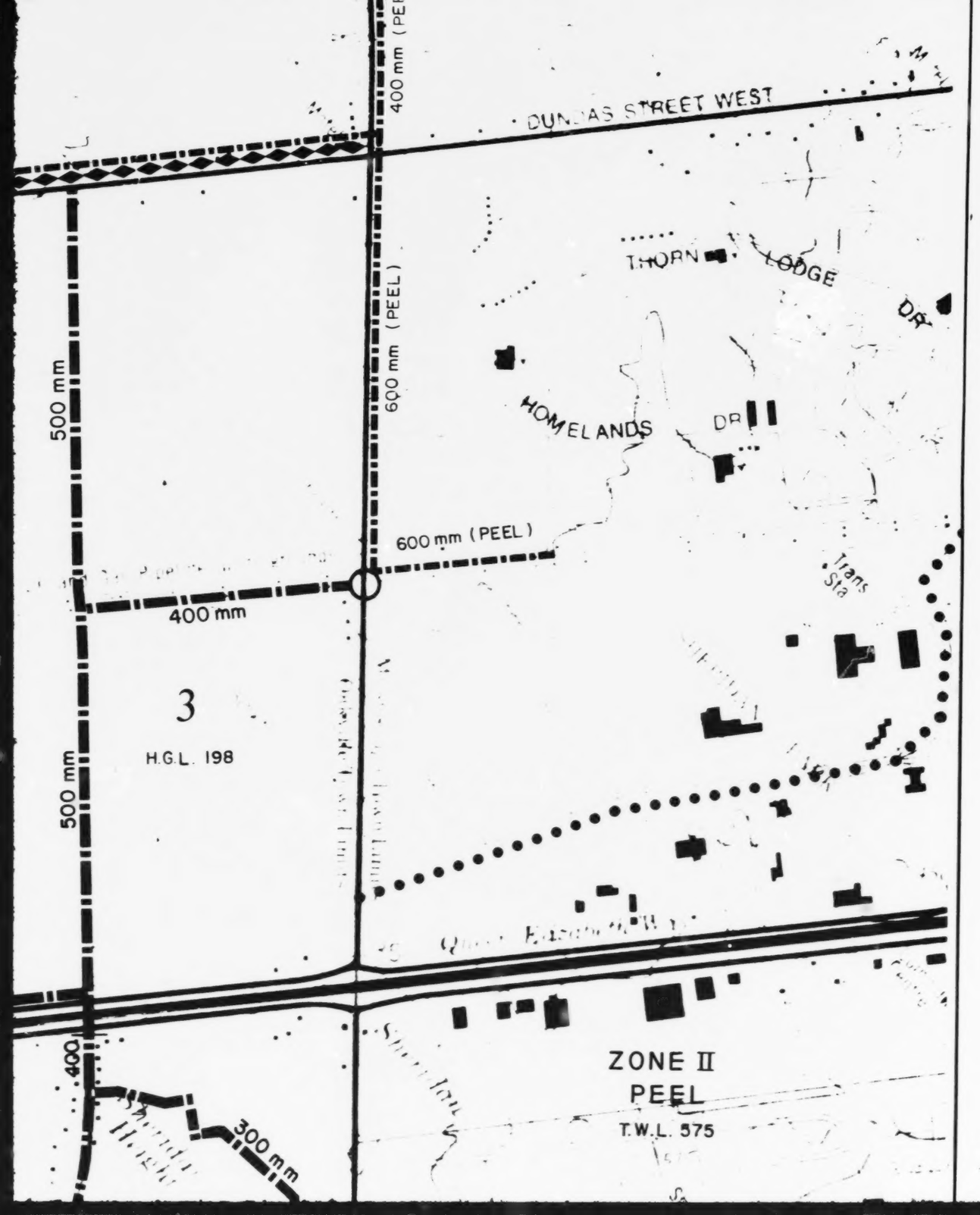
490

470

600 mm

400

Pool


DUNDAS STREET WEST
400 mm (PEEL)
600 mm (PEEL)
THORN LODGE DR
HOMELANDS DR
500 mm
600 mm (PEEL)
400 mm
3
H.G.L. 198
500 mm
400
300 mm
Trans Sta
ZONE II
PEEL
T.W.L. 575

TRAFALGAR ROAD

LINE ROAD

515

520

750 mm

600 mm

UPPER MIDDLE ROAD

500

EIGHTH LINE ROAD
BOOSTER STATION

ROAD

HARRINGTON HEIGHTS

Dam

Trans Sta

503

II

460

450

Transformer Station

Ditch

2

Pumping Station

400

RESERVOIR
No 1
T.W.L. 128

Mattiss

750 mm

348

750mm

Factory

Elizabeth

HWY

380

300 mm

PRV

PRV

400 mm

300 mm

300 mm

300 mm

H.G.L.

ROYAL WINDSOR DR.

400 mm

PRV

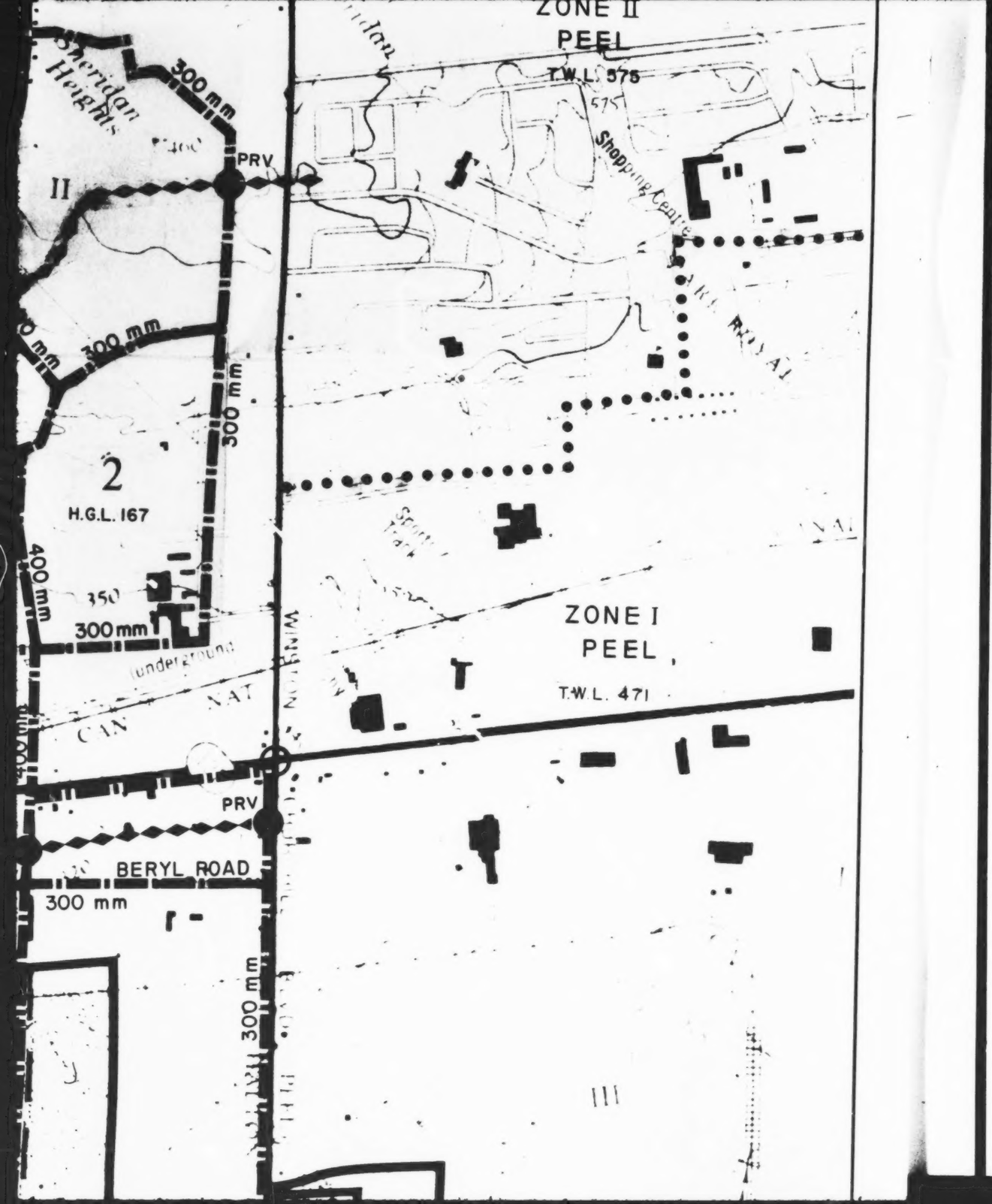
300 mm

Trans

Tree Nursery

300 mm

200 mm


ZONE II
PEEL
T.W.L. 575
575
Sheridan Heights
300 mm
PRV
II
300 mm
300 mm
300 mm
2
H.G.L. 167
400 mm
350
300mm
(underground)
CAN NAT
ZONE I
PEEL
T.W.L. 471
PRV
BERYL ROAD
300 mm
300 mm
III

DAVIS ROAD
BOOSTER STATION
750mm
CNV
320
Park
Bro
Creek
500 mm
DEVON ROAD
1
H.G.L.128
320
200 mm
350mm
350 mm
500 mm
DEVON ROAD
NINTH LINE ROAD
300
200 mm
350 mm
1
H.G.L. 128
750 mm
CNV
Hose
Sports Track
Pk
Curling Rink
Rink
CHARTWELL ROAD
Footbridge
MORRISON ROAD
Tree Nursery
Poultry Farm
Motel
LAKESHORE ROAD
Green
B.F.
ENNISCLARE PARK
280
250
900 mm
TO W.P.P.
Park

300 mm

Sewage Plant

Tanks

Dam

Park

Tanks